We claim:

1. A brushless DC motor/generator (10) comprising; a cylindrical outer rotor (19) with twenty two magnetically coupled poles (20) constructed with segments of permanent magnet material alternatively magnetized north and south, a stator having a core (8) of ferromagnetic material spaced inwardly of said rotor and defining a magnetic clearance gap (9) therebetween, said stator core having twenty-four slots (18) and defining teeth (23) between said slots (18), a three phase winding with coils (7) of insulated wire being wound around the teeth, therebeing mutual inductance between the phases of said stator, an electronic supply (11) including a power electronics system and a current control circuit means (14) to control the torque of said motor (10) and therefore its arresting force for braking a wheel (53) of devices on which people are displaced by said DC motor motorizing said wheel, characterized in that an additional two coils (7) per slot (18) with predetermined connection patterns: C, C', C, C', B', B, B', A', A, A', A, A', C', C, C', B', B, B', B, B', A', A, A', C', resulting in reduced torque ripple without any slot or magnet skewing, and wherein the magnetic path of flux produced by each phase current is not independent.

2. A brushless DC motor/generator (10) as claimed in claim 1 characterized in that a multiple combination of additions of the number of said twenty-two poles and said twenty-four slots (18), such as forty-four said poles and forty-eight said slots, or sixty-six said poles and seventy-two said slots or ninety-six said poles and eighty-eight said slots; and a wound winding (7) around said teeth (23) with one of either one coil per slot or two coils per slot.

3. A brushless DC motor/generator (10) as claimed in claim 1 characterized in that there are three Hall sensors (24) are mounted near said air gap (25) at predetermined positions and fixed to or side some of said teeth (23).

4. A brushless DC motor/generator (10) as claimed in claim 1 characterized in that there is a power electronics pulse width modulation driver (30) said pulse width modulation driver (30) having a three phase inverter (28) including six power MOSFETs (29), said current control system (32) being coupled to said inverter (28) for generating 120 electrical degrees rectangular phase current pulses, said control system (14) using a single switch modulation technique.

5. A brushless DC motor/generator (10) as claimed in claim 4 characterized in that said single switch modulation technique is comprised of three of said MOSFETs 30 being connected as an upper side of said inverter (28) and remain switched "on" by a modulation signal during a motor operation mode of said motor (10), three others of said MOSFETs (30) being connected as a lower side of said inverter (28) and used to measure motor phase currents during all sequences of the MOSFETs of said upper side.

6. A brushless DC motor/generator (10) as claimed in claim 5 characterized in that said MOSFETs (30) of said upper side of said inverter (28) are switched "off" during a generator operation mode of said DC motor (10), and wherein a modulation signal is applied on a gate of said three MOSFETs on said lower side of said inverter.

7. A brushless DC motor/generator (10) as claimed in claim 1 characterized in that said motor (10) is also used as a wheel braking device when used in a generator mode, said rotor (19) being connected to a hub (52) of a wheel (53) powered by said motor (10) when in a motorized mode.

8. A brushless DC motor/generator (10) as claimed in claim 4 characterized in that voltages across said MOSFETs (30) on a lower side of said inverter (28) are used to generate a current measurement for the purpose of motor current control of said single switch modulation technique.

9. A power electronics pulse width modulation driver and control system (30) for controlling the torque of a brushless DC motor/generator (10) and its arresting force for braking a wheel (53) of devices on which people are displaced by said DC motor motorizing said wheel, said brushless DC motor/generator having a cylindrical outer rotor (19) with twenty two magnetically coupled poles (20) constructed with segments of permanent magnet material alternatively magnetized north and south, a stator having a core (8) of ferromagnetic material spaced inwardly of said rotor and defining a magnetic clearance gap (9) therebetween, said stator core having twenty-four slots (18) and defining teeth (23) between said slots (18), a three phase winding with coils (7) of insulated wire being wound around the teeth, an electronic supply (11), said pulse width modulation driver and control system (30) comprising:

a three phase inverter (28) including six power MOSFETs (29), a current control system (32) being coupled to said inverter (28) for generating 120 electrical degrees rectangular phase current pulses, said control system (14) using a single switch modulation technique.

10. A power electronics pulse width modulation driver and control system (30) as claimed in claim 9, wherein said single switch modulation technique is comprised of three of said MOSFETs 30 being connected as an upper side of said inverter (28) and remain switched "on" by a modulation signal during a motor operation mode of said motor (10), three others of said MOSFETs (30) being connected as a lower side of said inverter (28) and used to measure motor phase currents during all sequences of the MOSFETs of said upper side.

11. A power electronics pulse width modulation driver and control system (30) as claimed in claim 10 characterized in that said MOSFETs (30) of said upper side of said inverter (28) are switched "off" during a generator operation mode of said DC motor (10), and wherein a modulation signal is applied on a gate of said three MOSFETs on said lower side of said inverter.

12. A power electronics pulse width modulation driver and control system (30) as claimed in claim 9 characterized in that voltages across said MOSFETs (30) on a lower side of said inverter (28) are used to generate a current measurement for the purpose of motor current control of said single switch modulation technique.